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ABSTRACT

Divided into five sections, this review and synthesis paper provides vocational educators with an overview of issues involved in the relationship between basic reading skills and vocational education. The introduction discusses reading in vocational education as both a curricular or educational issue and as an occupational or employment-skill issue. It presents four areas of questions which should be asked of vocational educators regarding readability, the relationship between curricular and occupational literature, reading instruction, and student reading needs. The second section, Reading in Vocational Education, reviews literature and research on reading in two parts: (1) reading as a curricular activity, with focus on three topics--vocational program prerequisites, analysis of textbooks and related literature, and reading program development, and (2) occupational reading. The third section concerns research on reorganizing reading priorities in vocational education. Section 4, Call for Research, lists ten topics for future studies: relationship of occupational literature to tasks, employers' perceptions of needed reading skills, readability index for occupational reading: general literacy versus occupational literacy, transferability, upward mobility, teacher education, interim strategies, special needs, and coordination between academic and vocational programs. A philosophy of reading for vocational education is found in the final section. (YLB)

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Information Series No. 200

BASIC READING SKILLS AND VOCATIONAL EDUCATION

written by

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1980

CE 023 644

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FOREWORD

Recent legislation and funding allocations provide evidence of a strong commitment to basic skills education on the part of the federal government. The Basic Skills Act passed by Congress as Title II of the Education Amendments of 1978 is the major legislative mandate under which grants for basic skills education are being administered.

Such activity at the federal level is reflective of public concern over students' declining test scores on national assessments of reading, writing, and mathematics skills. The yearly Gallup polls of public attitudes toward education sponsored by Phi Delta Kappa have shown a continuing concern over the need for more instruction in the basics. The 1979 edition of The Condition of Education by the National Center for Education Statistics showed that secondary school principals report increased emphasis on basic reading, writing, and mathematics as the greatest change in the schools in the past five years.

This emphasis on basic skills education exists in vocational education as well. Basic skills education has been a national priority theme in vocational education during the past year and promises to be of continuing concern in the future. For vocational educators, however, the term basic suggests basic to an occupation. The focus of basic skills for the vocational educator, therefore, is on those competencies required for success in an occupation. This paper provides vocational educators with an overview of the issues involved in the relationship between basic reading skills and vocational education.

"Basic Reading Skills and Vocational Education" is one of six interpretive papers produced during the second year of the National Center's knowledge transformation program. The review and synthesis in each topic area is intended to communicate knowledge and suggest applications. Papers in the series should be of interest to all vocational educators, including teachers, administrators, federal agency personnel, researchers, and the National Center staff.

The profession is indebted to Mr. L. Jay Thornton for his scholarship in preparing this paper. Recognition is also due Dr. Linda Reed, CEMREL, Inc.; Ms. Savannah Miller-Young, St. Louis, Missouri public schools; and Dr. John Peterson, the National Center for Research in Vocational Education, for their critical review of the manuscript. Dr. Carol P. Kowle supervised publication of the series. Mrs. Ann Kangas and Mrs. Margaret Starbuck assisted.

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INTRODUCTION

According to a recent issue of the Federal Register, "The separatist concept of the 'academic' versus the 'vocational' delivery system within our public school setting is no longer useful" ("Notice of Request for Suggestions . . . for Vocational Education," 1979, p. 33961). That sentence, prefacing the statement of the "Basic Skills" funding priority within the Bureau of Occupational and Adult Education, U.S. Office of Education, provides the context for this paper. The concluding sentence in that priority statement also provides structure for this paper: "Both academic and vocational programs should complement and further one another in producing persons who are prepared to function responsibly in a working world" (p. 33961).

The ability to read is not the only basic skill. Nor is it more or less basic than other communication skills or mathematics. Reading, however, is often subsumed in treatment of functional literacy, which includes elements of mathematics and communication skills. Reading, like mathematics or communication skills, needs to be considered as a separate entity, at least from this author's perspective.

The intention of this author is to examine the subject of reading in vocational education as both a curricular or educational issue, and as an occupational or employment skill issue. Other issues, such as the elimination of sex bias in reading materials, the adaptation of materials for those with certain handicaps, and the consideration of bilingual readers, have been excluded from this focus. The major issue under consideration here is whether reading problems in vocational education are different when viewed from a curricular and an occupational perspective. The perspective expressed here is represented by a series of questions related to the vocational curriculum, the potential employee emerging from that curriculum, and the vocational educator.

First, three student-oriented questions must be asked:

- Can graduates of vocational programs read literature required of them to enter and survive in an occupation?
- Can vocational students read general literature necessary to survive socially and economically?
- Can students within a vocational program read the literature in the curriculum which is necessary for graduation?

These three questions yield another set of questions to be asked of education in general:

- Is there a difference between skills required to read literature pertaining to an occupation and skills required for general reading?

- Are reading skills prerequisite to entry into a vocational program, and are they to be treated as deficiencies when limited or nonexistent?

Finally, there are questions in four areas to be asked of vocational educators. The four areas include the relative readability of vocational literature, the relationship between curricular and occupational literature, the need for reading instruction, and the type of reading required to meet student needs.

Regarding Readability

- Does a student who reads general literature at the ninth grade level read vocational literature at the same level? The literature used in a vocational program should be written at relatively the same readability level as the literature which the program graduate is expected to read as an employee.

- What are the readability levels of literature in an occupational specialty, specifically as they relate to each task to be performed?

Regarding the Relationship Between Curricular and Occupational Literature

- Does curricular literature and job-oriented literature match on a task-by-task basis?

- Do standard diagnostic reading scores (based on literacy requirements) indicate the grade reading level of students when applied to vocational literature?

Regarding Reading Instruction

- Should reading instruction be provided as a distinct course or be contained in the vocational curriculum? Reading intervention strategies are available to the vocational teacher which can be infused into existing curricula.

- Are vocational teachers sufficiently confident in their own reading abilities to address reading instruction as part of their curricula?

- Are vocational teacher education institutions providing preservice course work or experiences in methods of reading instruction?

- Is a reading specialist who does not possess vocational education credentials or expertise qualified to deal with vocational students' reading problems?

Regarding Reading Needs of Students

- Have cluster reading skills been identified which can be taught to provide for transferability among occupations?

- Are the reading problems of secondary vocational students the same as or similar to those of adult postsecondary students?

- Do vocational textbooks contain a graduated scale of reading ability requirements to allow students to increase their grade reading level in accordance with an increase in psychomotor skill?

- Is the residual benefit of reading skill development in a high motivational context being used to influence general literacy?

Conjecture about many of these questions has compounded the reading problem in vocational education. The author has proposed a set of statements regarding reading in vocational education which serve as points of departure for the opinions expressed.

READING IN VOCATIONAL EDUCATION

Occupational reading requirements include those skills necessary for basic literacy and skills peculiar to the occupational specialty. Vocabulary, semantics, and syntax in literature pertinent to the completion of an occupational task are different from those contained in literature read for entertainment, understanding of concepts, or information. Because occupational specialties contain reading requirements which depart from reading for basic literacy, reading needs to be addressed as a vocational skill, and reading instruction is appropriate in the vocational education curriculum.

Title II of the Education Amendments of 1976 (P.L. 94-482) supports the inclusion of reading in vocational curricula. According to the legislation, if a student's deficiencies in reading inhibit success in a vocational program, that student

can be considered academically disadvantaged and treatment is mandated. The inclusion of this mandate in Title II emphasizes the fact that the responsibility for correcting reading deficiency lies within the domain of the vocational educator.

The traditional concern for placement and follow-up in vocational education emphasizes the fact that success in a vocational program is determined by the ability of a student to obtain and sustain employment. In order to accomplish that, a student must be able to read the literature required to perform the tasks associated with employment. It is not enough for students to be able to read textbooks and other curricular literature, for these may not reflect job-oriented reading requirements. Furthermore, the ability to read textbooks is not a criterion for success in a vocational program. Occupational literature, including such items as instructions, specifications, safety warnings, formulas, employee brochures and memoranda, contracts, and codes, must be read. The ability to read and comprehend such literature is important to success in a vocational program.

Despite distinctions in types of occupational literature, legislated mandates in regard to reading, and requirements for success in vocational education programs, reading has been addressed as a curricular issue in vocational education. First, the assumption has been made that reading instruction for basic literacy is a prerequisite to vocational study and that such instruction satisfies vocational reading requirements. Second, the dominant reading issue is whether a student can read curricular literature such as textbooks. Third, student reading deficiency is treated by manipulating the readability level of the curricular literature or referring the student for reading remediation by a specialist who seldom possesses vocational credentials or expertise in occupational literature.

Reading remediation and manipulation of textbook readability may be useful in extreme cases of reading deficiency, but such efforts generally fail to address the occupational reading needs of emerging vocational students. Therefore, these students are often denied instruction to improve their skills in reading occupational literature. There is literature peculiar to each occupational specialty. Reading that literature is important for success, that is, obtaining and sustaining employment. The ability to do so is a vocational skill and is an appropriate instructional component within vocational education.

Reading As A Curricular Activity

Reading within the vocational curriculum is regarded here as involving literature pertaining to the course work of a

vocational student. It includes reading textbooks, teacher and commercially prepared curriculum materials, and such other trade or occupational literature used in the course of study.

Occupational literature is that literature which must be read by an employee in order to carry out the terms of employment, practice an occupational specialty, advance on the job, or transfer laterally within a cluster of occupations. It involves instructions, specifications, codes, manuals, employee contracts, memoranda, occupational journals, employment notices, and the like.

The need for well-developed vocational reading skills has long been recognized from a curricular perspective. In order to make use of a textbook in any vocational subject, it is necessary that the student possess the necessary reading skills. According to one group of employers and business teachers: "Only if teachers realize the importance of reading grade level and reading rate to each student's success in basic business classes can they take the necessary steps to provide suitable assignments which will lead to mastery of the basic business materials" (Scott, 1975, p. 25).

Materials developed by teachers and other instructional aids usually require some reading. A variety of studies has been undertaken to consider the skills needed in reading curriculum material and other educational literature. Research on reading in vocational education has focused primarily on three topics: (a) vocational program prerequisites; (b) analysis of textbooks and related literature; and (c) program development for specific target groups.

Vocational Program Prerequisites

By regarding reading skill as prerequisite to entry into a vocational program, educators can treat the analysis of reading ability as part of the screening process. At the Maryland Correctional Training Center, prior to considering reading and math skill tests for screening, staff had set "an arbitrary grade level" for entrance into vocational shops (Steurer, 1977, p. 1). Steurer concluded that Informal Reading Inventories (IRI) "directly test the skills that are needed for success in a shop" (p. 18) and are useful for screening potential students. A subtle difference in attitude toward vocational education's responsibility regarding reading might involve interest in reading prerequisites from the standpoint of curriculum development and program planning. In another example, Turner and Williams (1975) considered testing reading skills as a means of lowering the dropout rate. Establishing the reading levels of students entering a vocational program and considering those

levels during instruction is one means of ensuring their success in the program.

On the one hand, the research emphasizes restricting access to vocational programs based on the lack of skills. On the other, the research also shows that access to programs can be increased when reading deficiencies are identified and remedied. The problem underlying the distinction between these two points of view is one of deciding whether student needs are best met by limiting access based on reading ability, or increasing access by providing instruction to compensate for known reading deficiency. Increasing access appears to be the best alternative, especially as increased access to vocational education is a legislative priority.

Analysis of Textbooks and Related Literature

With the possible exception of the emphasis on the reading skills of disadvantaged students, research in reading in vocational education has been dominated by the analysis of textbooks and related literature. The direction of that inquiry has been to consider whether students are able and willing to read the textbooks assigned to them. Negative results from this inquiry have brought about interest in the examination of the readability levels of vocational textbooks.

Several studies have involved analysis of textbook readability levels, and several readability indices have been used. For example, McBrien (1975) described a "Readability Rater" to assess the level of reading difficulty of curriculum materials. Swain and Bell (1976) used the Rudolf Flesch Reading Ease Formula and the Robert Gunning Fog Index, both based upon sentence length and number of syllables, to determine the grade reading level (GRL) of literature. A carpentry study (Thornton, 1977) used the Flesch procedure, checked by the Fry Readability Graph, a process relating syllable count to sentence length. Another readability method is the Dale-Chall Formula (1948), which employs a "hard words" list, but the hard words do not particularly relate to vocational education. Klare (1974-1975) lists several formulas and procedures for determining literature readability, concluding, "As long as predictions are all that is needed, the evidence that simple word and sentence counts can provide satisfactory predictions for most purposes is now quite conclusive" (p. 98).

Karnes and Ginn (1976) compared the reading comprehension levels of postsecondary vocational technical students with the readability levels of the textbooks utilized in vocational-technical facilities in Mississippi. They found a discrepancy between the mean reading ability levels of the students and the

mean readability grade level of selected texts to be 3.51 grades for vocational students and 1.94 grades for technical students (p. 55). Thornton (1979) found the readability levels of carpentry textbooks to be bi-modal in distribution at the eighth grade and thirteenth to sixteenth grade reading levels. The mean grade reading level for carpentry students was found to be ninth grade, with reading instruction required for literature at the higher levels. Scott-Hunter (1978) examined the reading requirements of selected vocational programs and the readability levels of the required textbooks. The findings indicated that all the programs required reading of curricular materials. The study also showed that the textbooks were at a higher mean grade readability level than the grade at which the vocational programs were being taught. Caffey (1975) examined the readability of selected welding and air conditioning/refrigeration textbooks and tested the reading abilities of a random sample of students of these courses, concluding that "the books were found to be too difficult for the students to be successful in their study" (p. 14). VanderMeulen and Harris (1974) have provided an annotated list of textbooks and their readability levels from a variety of content areas.

The most comprehensive review of textbook readability is contained in the evaluation by the Cornell Institute for Occupational Education evaluation of materials in the program areas of auto mechanics, building trades, business and office education, child care, cosmetology, distributive education, and practical nursing. In Instructional Materials for Distributive Education (Bennett and Muncrief, 1975), for example, sixteen items from among secondary level instructional materials are rated according to readability level and five other criteria including accuracy, appropriateness, verbal and visual fluency, usefulness, and versatility.

Reading Program Development

Reading programs within vocational education generally fall into five categories. In some cases, students are referred to a reading specialist for remediation. In others, vocational English courses are offered in prevocational programs or in conjunction with vocational programs. Often vocational curricula are modified to reduce reading requirements or avoid reading problems altogether. Under some programs, vocational educators teach reading in their classrooms and shops. Finally, many programs emphasize reading as a target activity only marginally related to the vocational program.

For the most part, the reading difficulties of vocational students have been considered to be academic deficiencies. That consideration strongly supports the position that reading skills

should have been mastered as prerequisite to entry into a vocational program. The solutions have traditionally been either referral for remediation or internal or external reading course work. Little effort has been made to determine if occupational reading requirements are similar to educational requirements. An academic deficiency in reading does not necessarily predict a reading deficiency once a student is employed. The relationship has neither been proved nor disproved; it has only been assumed.

The following are examples of actual vocational reading programs. Educators in Collier County, Florida vocational schools (Perry, 1978) pretest the reading ability of vocational students and compare the results with the readability of the literature they will use in the program. Students who are determined to be reading deficient are referred for compensatory instruction. In Louisiana, the Natchitoches Central High School (Building Industrial Communication, 1973) has prepared curriculum materials for twelfth grade English, reflecting construction trade vocabulary, concepts, and skills. Staff in the Neshaminy School District in Langhorne, Pennsylvania (1972) developed a language arts program specifically for tenth to twelfth grade technical students. In each case the emphasis has been curricular and the solution limited to an external program of reading instruction or remediation.

Incardone (1978), discussing the causes of vocational student reading deficiency and what vocational teachers can do about it, stated: "The proliferation of content material is making ever-increasing demands on both teacher and student. There are new technological and scientific methods and data to keep abreast of, and textbooks have become more complex" (p. 51). Subsequent to identifying some probable causes of student reading problems, Incardone recommended: "[O]ne cause of reading problems that vocational education teachers can do much about is that aspect of classroom instruction that deals with subject matter reading skills" (p. 51). No mention is made of employment-oriented reading skills; the issue is addressed as curricular in nature.

Reiff (1975) recommended that reading deficiencies of business education students be dealt with by the business education teacher. Parker (1976) emphasized word meaning instruction by business education teachers to help overcome communication problems. Johnston (1974) reported a cooperative arrangement between a cosmetology instructor and reading teacher which exemplified the internal-external approach to reading program development. In this case, some instruction would occur in the vocational classroom. Another example of this cooperative approach is Georgia's Coordinated Vocational Academic Education program (CVAE), which is a year-long course for students in grades nine through twelve ("Georgia's Winning Ways," 1979). Teaching of occupational competencies and emphasis on remediating

individual deficiencies in reading, language, and math are both part of the curriculum.

A number of programs recommend manipulation of curriculum materials to meet the needs of students with reading deficiencies. Materials are reworked to reduce their readability levels to a point which would approximate the grade reading level of the student. A project sponsored by the Bureau of Occupational and Adult Education, U.S. Office of Education (Morrell, 1977), developed vocational modules with controlled readability levels. Physics modules for vocational students, tested at the Forsythe Technical Institute, are written at the lowest possible readability level (Parsons, 1976). The Multiple Learning Strategies Project in Michigan provided learning modules with formats for the "low" reader in small engine repair (White, Wright, Constantini, Smith, Pitts, Helder, Steinberg, Woodward, and Foster, 1978), building maintenance and engineering (Steinberg, Smith, Livingston, White, Kennedy, and Polen, 1977), and graphics (Pettit, Smith, Reimer, Woodward, and White, 1978).

Targeted programs are the most common means of meeting the needs of vocational students with reading difficulties. Again, this is consistent with the traditional notion that reading problems are to be dealt with outside the vocational curriculum. Some examples of targeted programs are the following. The Texas Coordinated Vocational-Academic Program (Thompson, 1971) proposed to retain potential dropouts by collateral courses which would assist in overcoming their academic deficiencies. Suggestions for overcoming unemployment of disadvantaged farm laborers (Dawson, 1964) included reading specialists in elementary education and programs specially designed for the functionally illiterate. Toledo, Ohio schools instituted supplementary language arts programs (Prediger and Muntz, 1968) to help potential students who might otherwise be denied entrance into vocational programs overcome reading deficiencies. Three thousand male dropouts in the Gary Job Corps in Texas (Frost and Pilgrim, 1969) were enrolled in a reading program to prepare them for advanced vocational courses. The Minnesota Work Opportunity Center (Decker and Anderson, 1969) developed a reading course designed for high school dropouts and the hard core unemployed. Voluntary remedial reading was offered to job counseling center clients in an area of high unemployment and concentration of black and Puerto Rican families (Greenfield, 1966). Dayton, Ohio's Project Emerge (Crawford, 1974) provided a component in reading in an attempt to overcome a high dropout rate, in part due to underachievement. McPhail (1978) described a reading and study skills summer course for black and minority students in health occupations.

Correctional institutions have also provided supplementary reading programs for vocational students within their inmate

population. The Pennsylvania Correctional Institution at Camp Hill (Program of Vocational Rehabilitation, 1968) provided special instruction for inmates with reading deficiencies. Rikers Island inmates, in conjunction with vocational training, received remedial reading instruction during a project designed to test the usefulness of vocational training combined with postrelease services (Mandell and Sullivan, 1976).

The importance of improving the reading skills of disadvantaged students has long been recognized. The literature indicates that reading has been a component of most vocational programs developed for these individuals. In 1976, P.L. 94-482 for the first time provided for identification of disadvantaged persons based upon assessment of their ability to read. Research reports demonstrate that reading assessment has related to general literacy or the ability to read curriculum materials. Assessment of employment-related reading has been noticeably absent. Disadvantaged students in vocational education are less likely to be served appropriately by academic reading considerations than they would be by careful examination of needed occupational reading skills.

Occupational Reading

Emphasis on reading as a curricular activity fails to take into account advice from the writers of vocational education materials. In one study of carpentry textbooks (Thornton, 1977), every text examined referred the reader to manufacturer's installation instructions, state safety codes, state building code manuals, and other such occupational literature. In a review of seven occupational textbooks in various vocational program areas, researchers found the following language:

> Machine Shop: "The operators' instruction manual will state the grade of oil that should be used for the various machines." (Lascoe, Nelson, and Porter, 1977, p. 178)
>
> Medical Assistant: "An excellent way of acquainting yourself with these medications is to read medical publications. . . . Read the manufacturers' literature . . . . Read the recommended dosage . . . ." (Frederick and Kinn, 1974, p. 408)
>
> Dental Assistant: "Manufacturer's instructions should be followed closely for the operation of the specific autoclave to be used." (Chasteen, 1975, p. 150)

Small Engine Service: "Before starting to work on an engine, look at the manufacturer's service manual . . . ." (Roth, 1978, p. 123)

Hotel and Restaurant Management: "Student is referred to the Occupational Safety and Health Act (OSHA) of 1970 for compliance." (Lundberg and Armatas, 1976, p. 302)

Refrigeration: "Local and national refrigeration and electrical codes must be followed when servicing all systems." (Althouse, Turnquist, and Bracciano, 1975, p. 461)

Welding: "Manufacturer's recommended methods are very important and should be followed at all times." (Giachino and Weeks, 1976, p. 10)

The authors quoted in this sample recognize that no single textbook or curriculum can provide all the information necessary to practice an occupational specialty. The best supplements are the various types of literature prepared for the specific trade or discipline. But beyond the advisory to read occupational literature, very little has been done to ascertain whether the student is able to read that literature. Since the evidence points to an occupational reading requirement, it follows that students' reading abilities must be examined in the context of such a requirement.

Some emphasis on reading of occupational literature has occurred in programs designed to promote functional literacy. Researchers have cited the need for functional literacy in occupational situations (Golub, 1973 and Golub, 1974) in order to justify a computer-assisted literacy development program. In another report ("Curriculum," 1975), students in Santa Clara, California received assistance in qualifying for jobs by participating in career English programs. The military has also been concerned with the development of occupational reading skills. In an anthology of materials for use in functional literacy instruction (Sticht, 1975), a distinction is drawn between functional and general literacy in an attempt to bridge the difference between the literacy skills of army personnel and the literacy demands of particular jobs.

Occupational reading requirements have also entered into the design of programs dealing with occupational skill analysis. For example, in the state of Washington, one focus of an occupational skills analysis was the identification of basic communication skills needed for entry level and supervisory level jobs in seven occupational fields (Blue, Breslin, Buchanan, and Leingang, 1976). The seven fields included agriculture, business and office, distributive and marketing, health, home and family life, technical, and trade and industrial. A survey of thirty

employers and supervisors conducted as part of this study showed that employees get information by reading as well as listening. The authors concluded that written instructions at least supplement verbal instructions.

In a similar study in Wisconsin, Farning and Boyce (1976) surveyed vocational-technical graduates and employers in fourteen program areas in order to rank forty-six occupational competencies. As part of the study, supervisors rated the relative importance of reading for comprehension in their respective fields. Results of the survey showed that the recognition, comprehension, and recall of essential information was ranked first in importance by employers in the areas of business machine operation, auto mechanics, auto body, welding, printing, industrial occupations, fire science, police science, and service occupations.

Research on the subject of occupational reading has not clarified the kinds of literature a program graduate should be able to read to enter, move up, or make a lateral transfer within job clusters. Evidence indicates that employers and educators concur about the importance of reading occupational literature. That perspective has been translated into practice in the curriculum, however, without inquiry into the kinds of literature which must be read and the relative degree of difficulty of such literature.

The importance of developing vocational students' skill in reading occupational literature is stated by Schewe (1971) in a paper presented at the National Reading Conference in Tampa, Florida:

> The development of American vocational education has evolved to a well-disciplined program of a practical orientation that has led the vocationally oriented student to define his goal so narrowly that no room is left for reading skills needed in coping with the burgeoning changes and innovations of modern business and industry. The first goal of reading instruction to vocational students should be to have them become proficient in basic reading skills which they can apply directly to the . . . content materials in (their) chosen fields. (p. 1)

REORGANIZING PRIORITIES

A considerable volume of important research, thoughtful position papers, and useful developmental studies has been produced on the subject of basic reading skills and vocational education. This work, however, has most often been produced in reaction to

problems peculiar to a particular situation, locality, or a specific target group. Much of the usefulness of these individual efforts is limited by the narrow context in which they have been produced. The priorities of a narrowly defined problem have established the structure of the search for solutions. Thus, the solutions found have not lent themselves to wide application. Furthermore, the emphasis in past research has been on the treatment of reading problems in the context of educational literature, not in the context of occupational literature.

Vocational education has traditionally stressed the importance of both work and education. Emphasis on work demands training in occupational skills; emphasis on education requires a firm grounding in basic academic skills. Justification for psychomotor skill development relates to that part of the vocational education philosophy predicated upon the value of doing something. Justification for reading development in and for vocational education relates to that part of vocational education philosophy derived from general education. The tension between the growing importance of competency-based vocational education and continued reliance on textbook instruction is perhaps an unfortunate result of this dual philosophy of education and work. The determination of what is most important, whether it is reading manufacturers' instructions or reading a textbook, will be influenced by the emphasis on work or education in vocational education planning. A reconciliation between a competency-based, skill development approach and an academic approach seems to be the most desirable route for vocational educators to take.

A reorganization of the reading priorities in vocational education must begin with the assumption that the primary goal of vocational education is the preparation of individuals for work. This means that the first priority for reading in vocational education must be occupational. It must be known how much reading is necessary, what kind of literature must be read, and what are the required skills to attain, maintain, and achieve upward mobility in employment or lateral transferability across employment clusters. There is sufficient preliminary evidence to conclude that reading is required in most, if not all, kinds of employment. If it is required for work, it is a vocational skill. As a vocational skill, reading is appropriately a part of vocational instruction. It follows then that teacher education institutions must prepare vocational teachers in reading instruction.

Once reading for work is emphasized over reading for educational achievement the peripheral areas of reading in vocational education can be addressed. Educational materials must be revised to reflect occupational reading needs. If textbooks are

to be used, their readability for each task should reflect the readability of the literature which must be read to accomplish that task. Prevocational education materials likewise should reflect developmental reading needs of the occupational specialty. Career education and lifelong learning programs should adopt curricular materials which relate to careers and lifelong skills instead of fixed-term educational reading requirements.

A different approach to reading instruction may also be required in programs for students with special needs. In some of these programs, reading requirements are modified or eliminated to accommodate the reading deficiencies of students while stressing the skill training component of vocational education. It is assumed that circumvention of reading permits the development of psychomotor skills which are needed for employment. Special needs students without vocational reading skills, however, may not be able to function adequately on the job. In instances where circumvention of reading is the only way to develop skills, it must be ascertained that the job for which the student is being trained does not have reading requirements. Furthermore, survival in a job may require moving beyond an entry level position that appears to require no reading. Employment assessment, if survival is to be considered, must also include consideration of possible upward or lateral movement and resulting changes in reading requirements.

On the other hand, programs for individuals identified as disadvantaged for reasons other than reading deficiency have included reading components. These components must be analyzed to ensure that they relate to the reality of reading for work instead of simulated and possibly artificial textbook reading requirements. If conditions warrant the removal of reading skill development in order to facilitate development of other vocational skills, then employment potential must be assessed recognizing that an important occupational skill has been deemphasized or avoided. As a result of such a decision, occupational survival may be greatly impaired. In all cases, the reading component must be addressed as an occupational issue. Reducing the readability level of textbooks will not affect reading requirements on the job. As Frye and Bates (1974) conclude:

> Historically, reading problems have been laid at the door of the English teacher. And if that failed, and usually such isolated efforts are doomed to fail, the secondary reading specialist was rushed in to solve remedial reading cases. The assumption . . . is a myopic view that has hamstrung reading instruction at the secondary school level for years. . . . For students in vocational-technical programs,

> trade area teachers must be expected to provide reading instruction. (p. 52)

Students arrive at vocational education programs expecting instruction in skills which will prepare them for work. To deny instruction in any one skill because that skill should have been learned elsewhere is, in part, a denial of students' expectations.

CALL FOR RESEARCH

Assumptions underlying research needs in reading for vocational education have been identified in the previous section. Once reading is placed in an occupational perspective, a substantial portion of the research already reported will be useful for the improvement of reading skills of vocational students. Some of the research will require replication, but most of it will provide a useful point of departure for more focused inquiry into reading intervention strategies. For example, there is sufficient evidence that textbooks are written at a higher average readability rate than the average grade reading level possessed by vocational students. Measures of average readability and reading ability do not elicit enough information, however. The reorganization of priorities facilitates more useful information, as it focuses on topics such as the relationship of tasks to required literature. It is not enough to know that the mean readability level of a textbook is ninth grade, for that allows an undefined range and undefined modality of high and low readability levels. It is more useful to research the readability range and modality of a set of instructions for a given task. Such information is related more specifically to vocational education objectives.

According to P.L. 94-482, all students who are deficient in reading skills are considered to be disadvantaged. Students are considered deficient in reading ability when their reading level is two grades below their actual grade level. Thus, if a student is determined to be two grade levels below the norm in terms of general literacy, as evaluated by tests devoid of vocational content, that student is considered to be disadvantaged. Yet, there is no evidence that the reading skill required to understand general literature is identical to skill necessary to translate occupational literature in the performance of a task.

Vocational students are often regarded as less skilled in reading than their academic counterparts. If this were true, where are treatment programs which isolate vocational need? Massey (1979) has stated:

> When I asked why the school did not offer the vocationally-oriented students an English program especially for them, I did not mean a special geared-down version of the college bound class, an insult to their intelligence. The reason students do not respond is not that they are less intelligent; it is that their interests and motivations lie in other fields. (p. 117)

The possibilities for research and development in occupational reading are nearly unlimited. The ten areas listed here are not meant to be exhaustive, but only to reflect the theme of this report and continue the effort at synthesis. Hopefully, they will stimulate future research and development in occupational reading.

Topics for Future Studies

Relationship of Occupational Literature to Tasks

This effort would involve collecting literature found in an occupational specialty, relating it to a task or tasks within that specialty, and determining the reading skill necessary to master that literature. Task analyses are readily available, as are computerized readability procedures.

Employers' Perceptions of Needed Reading Skill

Several studies have been reported in which employers have been asked to rank the importance of reading in terms of a list of competencies. Future research should inquire of employers their perceptions of the amounts and kinds of literature their employees must be able to read to enter, move up, or transfer laterally.

Readability Index for Occupational Reading

Readability formulas presently available relate to syllabication, sentence length, and vocabulary. Serialization and sequencing are major components of instructions and specifications, as are numbers in context. Research is needed to establish a readability index applicable to the requirements of vocational reading.

General Literacy Versus Occupational Literacy

Research is needed to examine the requirements for general literacy and occupational literacy to establish the ways in which

the two are similar and different. The amount or impact of required reading that exists in the translation of literature to performance of a task should be determined. Comprehension may be modified in the context of translation. Standard diagnostic reading scores should be tested to assess their value as adequate occupational reading indicators. Grade reading levels may not be useful as indicators of reading ability in vocational education. For example, carpentry may be taught to tenth graders, but that does not alter the fact that the skills taught are the same as those taught on a postsecondary level.

Transferability

Research and development must be designed to provide instruction which will accommodate skills necessary to facilitate transferability among job clusters. What skills and their attendant levels can be grouped to provide for lateral transfer among occupations? The answer to this question could provide a basis for prevocational English programs which accommodate career education models.

Upward Mobility

The reading requirements of occupations should be examined in terms of upward mobility. Inquiry is needed into the direct relationship of reading ability and upward mobility. At what point does an employee seeking occupational advancement have to read theoretical or anticipatory literature instead of that which relates to an immediate task? An answer to that question could identify the need for a model which includes advanced reading procedures.

Teacher Education

Acknowledgment of the importance of reading in vocational education suggests a responsibility to provide vocational teachers with the skills needed to address reading in the shop or classroom. An English class or two may not provide adequate instruction in occupational reading. Research and development is required to provide vocational teachers with reading intervention strategies, as vocational teachers may not be oriented to reading instruction. It might be necessary to ascertain the level of reading skills of vocational instructors and their relative comfort with occupational reading. These inquiries will need to focus upon both preservice and inservice teacher education programs.

Interim Strategies

Despite the significant amount of preliminary research needed to address reading as a priority in vocational education, reading skills must be dealt with in the interim. There is sufficient research in content areas to provide interim strategies to deal with student needs.

Special Needs

For some students, it will be necessary to avoid the issue of reading skill development if they are to function in a vocational program. Employment potential and survival need to be assessed when students lack reading skills. It would be a deception to train students for occupations in which reading deficiency would preclude entry or survival. Avoidance of the problem may be necessary in some cases, but the deficiency tolerated must be weighed against the conditions existing in actual job situations.

Coordination Between Academic and Vocational Programs

As indicated in the Bureau of Occupational and Adult Education's 1979-1980 priorities, academic and vocational delivery systems must complement one another. Research into and development of coordinated strategies to effect functional literacy is important to both systems. Prevocational programs which adequately prepare students to meet occupational reading requirements should be encouraged. Research must be designed to coordinate reading across all delivery systems.

A PHILOSOPHY OF READING FOR VOCATIONAL EDUCATION

This effort to address reading in vocational education began with a statement from the Federal Register regarding coordination between academic and vocational delivery systems. Likewise, the conclusion of this report must refer to that charge concerning coordination of delivery systems. The needs of students and the overall need for an educated society cannot be served in an atmosphere of elitism.

Just as there must be coordination between delivery systems, there must be responsibility taken for the provision of instruction in basic skills. This concept is not altered by the assumption that reading skills are prerequisite to entry into a vocational program. If those skills--whether reading, mathematics, speech, or a similar skill--are required for a vocational program graduate to practice an occupational

specialty, they are vocational skills. If the student entering a vocational program does not possess those skills, instruction in them is appropriately a part of the vocational program.

The literature has been clear on the point that reading is a problem in vocational education. Furthermore, a review of that literature indicates the major emphasis of inquiry into the problem has been from the point of view of curriculum content. Even that emphasis implies that a problem exists with occupational reading and that reading instruction does and should occur somewhere other than in the vocational curriculum. Although reading of textbooks and other curriculum materials is important, that is not the critical issue in vocational education. The crucial issue should be how to ascertain that program graduates can read literature required of them in the practice of their occupational specialties. A case has already been made for the implications of reading to perform tasks differentiated from reading for cognitive understanding.

Success in a vocational education program is evaluated by the program graduate's ability to obtain and sustain employment. It follows naturally that success in reading should be measured by the ability of the program graduate to be able to read whatever literature is required in that job. The conclusion that employment-related reading skills are critical to vocational education programming leads to the potential for a concise mission statement. Reading is a vocational skill and is appropriate in the planned instruction of the vocational curriculum.

Vocational education has available a resource which can greatly enhance the likelihood that the reading deficient individual will overcome the isolation of illiteracy. That vocational education resource is motivation. The student who has not had experience with prevocational course work often experiences first success in the manual skills. This success can provide for motivation to achieve success in related areas. Success promotes success; vocational reading can promote general reading.

Reading is a vocational skill; its instruction is appropriate in the vocational curriculum. Vocational education is functionally holistic. Therefore, vocational education is bound by the responsibility to draw upon its motivating forces to ensure that its clients are functionally literate.

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